

# Putting the Globe in the Sphere: Climate Change Scientists in the Public Sphere

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## Abstract

*This paper considers the implications of climate-change scientists' participation in the public sphere for Habermas's argument that the mass media is degrading democracy (Habermas, 1989). Academic research at the end of the 20th century documented many pitfalls encountered by climate-change scientists in their efforts to publicize their concerns about the planet in the 1980s and 1990s. By the time the Fourth IPCC Report was released in 2007, however, such scientists were already more sophisticated in their engagement with the mass media and were using the Internet to improve their ability to contribute to debate beyond their own intellectual community. By considering the way climate-change scientists engaged with journalists and the public in the years leading up to 2007, this paper argues that the actions and experiences of climate-change scientists this decade have contributed to our understanding of how journalism is increasingly "embedded in and largely contextualized by the other media output with which it appears" (Dahlgren, 1991, pp. 16-17). More tentatively, the paper flags the possibility that an "ethic of unfinish" on the Internet, as elaborated by Luke Goode (2005), might be contributing to a greater acceptance among journalists and the general public of uncertainty in the natural sciences, with unpredictable implications for the communication of climate-change risk.*

## Keywords

*climate change, scientists, uncertainty, public sphere, ethic of unfinish, risk communication*

## 1 Introduction

In October 2007 a remarkable event occurred. A very large group of hard-core scientists became, for a moment, international celebrities when the Intergovernmental Panel on Climate Change (IPCC) was awarded the Nobel Peace Prize. In the years that have followed, climate change has gained unprecedented media attention. But prior to the release of the 2007 IPCC

report, climate-change scientists around the world were already mounting a small revolution, improving their media skills and using the Internet to speak more directly with the public.

This paper considers the implications of climate-change scientists' participation in the public sphere for Habermas's argument that the mass media is degrading democracy (Habermas, 1989). It begins by providing a brief overview of research into climate-change scientists' interaction with the mass media that highlights negative outcomes for scientists. It then locates experimental science within Habermas's public sphere, before turning to the concepts of public sense-making (Dahlgren, 1991), deliberative democracy (Thompson, 1995) and the "ethic of unfinish" (Goode, 2005) for a broader analysis of climate-change scientists' engagement with contemporary media.

## **2 Who Are Climate-Change Scientists?**

For the purpose of this paper, consensus climate-change scientists are defined very broadly as climate-change scientists whose views in the public sphere (see Section 4 for definition) generally accord with successive reports into the scientific basis of climate change compiled by Working Group 1 of the Intergovernmental Panel on Climate Change (Connolley, 2006; Hunter, n.d.). The IPCC was established in 1988 and since then has compiled four comprehensive reports. More than 1,000 experts participated in the most recent of these reports, which was published in 2007 and cites thousands of peer-reviewed scientific papers on climate change in concluding that it was 90 per cent certain that human activity since 1750 was leading to global warming (IPCC, 2007).

For the purpose of this paper, scientific climate-change sceptics are defined as scientists who are sceptical about the findings of Working Group 1 of the IPCC, the extent to which climate change is anthropogenic (human-induced) and/or the need for reductions in anthropogenic greenhouse gas emissions.

## **3 The Legacy of 1988**

When US climate-change scientist James Hansen addressed Congress in 1988 to make what was then the scientifically controversial claim that he was 99 per cent sure the drought experienced in America that decade was due to global warming (Ungar, 1992, p.491), the media catapulted him and the issue to mass US public attention. As Princeton geophysicist Michael Oppenheimer observed, "I've never seen an environmental issue mature so quickly, shifting from science to the policy realm almost overnight" (as quoted in Weart, 2006). But

there was a price to pay. In the short term “there was such a concerted [scientific] reaction that it stands as a cautionary tale” (Ungar, 1998, p. 512). Hansen was criticised by his fellow climate-change scientists for trading strict adherence to scientific knowledge about climate-change science at the time for sound-bites, headlines and spectacle (Weart, 2006). His “99 per cent sure” comment gained so much media attention that he is reported to have regretted making it (Ungar, 1992, p. 492). In the words of Ungar, writing in 1998, “In the scientific commentary on the issue, his temerity stands as nothing less than an act of infamy” (p. 512).

James Hansen encountered three media pitfalls following his address to Congress: at the outset, he gained media attention as a result of the spectacle of the drought but was criticized for this by colleagues who considered his comments did not accurately reflect the uncertainty of scientific knowledge on climate change at the time; in the follow-up, brevity and lack of context in journalistic mediation resulted in “[n]ews reports [that] often failed to explain that scientists never claimed that a given spell of weather was an infallible reflection of global warming” (Weart, 2006); and in subsequent years, scientific controversy gained more media attention than did increases in scientific consensus (McComas and Shanahan, 1990). As another outspoken scientist of the day, Stephen Schneider, confessed in his discussion of the events of 1988, in these circumstances each scientist “has to decide what the right balance is between being effective and being honest” (as quoted in Wilson, 2000, p. 206).

Consensus climate-change scientists have complex messages to impart that are global and multi-generational in their implications and the audiences they must reach. In the mass media, the path to publicity for scientists attempting to explain the findings of their research in terms that accord with the qualifications, complexities and uncertainties of their disciplines is rarely smooth. In a study of the role of scientists as sources in coverage of climate change in British broadsheet and tabloid newspapers over the three years to 2001, for example, Taylor and Nathan found climate-change scientists were generally quoted by journalists to lend legitimacy to articles but were rarely given the opportunity to present important data or qualify their comments by referring to scientific uncertainty. Ungar, reporting in 1992 on the results of his content analysis of a comprehensive range of United States media sources, noted that in the cooler weather of the four years following the summer of 1988 the media “featured stories and editorials stressing scientific uncertainty (see also Rogers’ findings later in this section), costs, and the need for a ‘cool-headed’ response” (Ungar, 1992, p. 494). And in 1999, McComas and Shanahan, analysing the coverage of climate change in the United States from 1980 to 1996, noted an increase in the reporting of scientific controversy after 1988 despite a significant increase in scientific consensus.

In the longer term, then, Hansen's attempt to turn the mass media preference for dramatic, visual, real-world events to his own advantage may actually have contributed to public scepticism of climate-change science. Writing in 2000 but quoting research by Moorti published in 1991, Wilson concluded that

[g]lobal warming reporting began with catastrophism, with dramatic overstatement at the beginning of a new finding as a news hook, and now uncertainties are being overstated as part of a new hook to a story that is generally accepted. (p. 205)

Rogers, writing in 1999 on focus-group research into the reception of climate-change media reports, found that lack of context can result in journalists' attempts to provide balance in their coverage of scientific controversy leading to sceptics' views being given the appearance of having similar support in the broad scientific community to consensus views (p. 195). In addition, Rogers found that the media's preoccupation with the drama of scientific controversy had resulted in audiences gaining an appreciation of scientific uncertainty that caused them to be sceptical of the consensus view rather than knowledgeable about the place of uncertainty in scientific method. As Dunwoody noted in 1999, journalists' attempts to provide balance may also result in scientific factions willing to seek publicity in the mass media at times of scientific controversy being able to use uncertainty as "a rhetorical or political tool" (p. 77).

In order to contextualise these negative findings and compare them with trends in consensus climate-change scientists' interactions with the mass media prior to the release of the 2007 IPCC report, in the following three sections I will attempt to locate scientists within Jürgen Habermas's description of the public sphere. This will enable me to analyse Habermas's concept of the public sphere in terms that are useful to the discussion of climate-change scientists in the mass media.

#### **4 The Public Sphere**

The public sphere, as conceived of by Jürgen Habermas in *The Structural Transformation of the Public Sphere: An Inquiry into a Category of Bourgeois Society*, is a metaphorical space in which individuals come together to "deliberate about their common affairs" (Fraser, 1992, p. 110), criticize public authority and reach political consensus through rational argument and the use of their reason (Habermas, 1989, p. 51) – that is, to engage in rational-critical debate. Habermas's ideal public sphere is essentially dialogical, rooted in face-to-face speech, though it allows for mediation through "a small-scale press whose primary function is to generate

public dialogue about politics” (van Krieken et al., 2006, p. 442). However, it has been widely acknowledged that, although universal access to the public sphere is essential to Habermas’s aspirations for a stronger democracy, the bourgeois political public sphere excluded many groups, including women, coloured people, the poor and the illiterate (Calhoun, 1992; Fraser, 1992; van Krieken et al., 2006; McKee, 2005). While Habermas acknowledges the anti-democratic implications of such exclusions, he never fully resolves the tension between his democratic aims and his concern about the expansion of the public sphere into the realm of popular culture, where rational-critical debate must share the stage with, contend with or concede ground to trivialisation, commercialisation, spectacle, fragmentation and apathy (McKee) – where “[j]ournalism’s critical role in the wake of advertising, entertainment and public relations becomes muted” (Dahlgren, 1991, p. 4).

As Goode has noted, “Habermas sees a tragic trade-off unfolding. The expansion of democracy has come at the cost of its continual degradation” (2005, p.23). Habermas considers much of that degradation to be taking place in the mass media, where entertainment takes precedence over deliberation on issues of common political importance – that is, where culture is consumed rather than debated (1989, pp.159-175).

Consensus climate-change scientists, with their rational-critical focus and skills, on the whole may be thought to be more comfortable and effective in the bourgeois public sphere than in its current manifestation, particularly in view of their advocacy of consensus views. However, scientists’ preference for avoiding political debate (that is, their preference for confining their overt public criticisms to science) and the status afforded them as a result of their roles as experts would initially appear to be at odds with a strict definition of the bourgeois public sphere.

## **5 Publicity, Science and the Bourgeois Public Sphere**

At this point it is worth considering the extent to which Habermas, in *Structural Transformation*, neglected the role of experimental science in the rise of the public sphere. Zaret (1992) argues that experimental science, far from being incidental to the development of the public sphere, was crucial to it.

In Zaret’s view, “the expectation that public use of reason will lead to good ends...derived principally from well-publicized triumphs of experimental science” (1992, p. 227). In his opinion, the ability to publicize experimental science made possible by the printing revolution created the very forum in which scientists’ findings could be reviewed by their peers. In the

public sphere of science, he contends, the objectivity of science was tested and “reason’s reign over opinion ... held to be complete” (1992, p. 228). Hence, Zaret argues, “[t]he communications revolution wrought by printing and the progress of experimental science must be key factors in explaining how public opinion acquired its social authority” (1992, p. 227).

Zaret’s analysis, however, is more subtle than this and may be seen to address a criticism of *Structural Transformation* mounted by Dahlgren that Habermas

seemingly clings to an ideal [(the bourgeois public sphere)] whose historical concreteness he has penetratingly found to be an ideological distortion. There is consequently a sense of a dead-end about the study. (Dahlgren, 1991, p. 5)

The value of Zaret’s critique of *Structural Transformation* for the purposes of this paper lies in his argument that opinion in the bourgeois public sphere derived its authority not from “critical, rational habits of thought... isolated from the brute realities of material civilization” (1992, p. 230) but from a number of public spheres both popular and scholarly (1992, p. 230) and an historical intermeshing in society of capitalism, religion and science (1992, p. 231). While Habermas disputes the objectivity of the natural sciences, he does not dismiss the natural sciences as disciplines (see the following section). As such, Zaret’s conclusion that “the current prospects and future of the public sphere seem reasonably secure in a world that continues to be shaped by these three forces” (1992, p. 231) attributes to science an enduring and effective role in the contemporary public sphere.

## **6 Science, Scientism and Politics**

In works written after *Structural Transformation*, Habermas pays considerable attention to science, but not so much in an attempt to critique science itself as to critique scientism – the application of scientific principles to the social sciences and politics. In so doing, Habermas does not reject instrumental reason or technology. Rather, according to Goode, he argues that

[we] should respect the integrity of scientific and evaluative discourses by acknowledging their analytical autonomy and their practical interdependence: the language of science, of technology, of means, always entails normative considerations, just as the language of values, goals and ends, misfires when it’s unhinged from pragmatic considerations. (2005, p. 62)

In developing his concept of “*procedural* rationality” (Goode, 2005, p. 62, original emphasis), Habermas considers both the decisionist and the technocratic models of scientism. In the decisionist model, as Goode describes it, experts engage in research at the behest of politicians but leave those politicians to make the choices that will decide the future of society, legitimized by acclamation through the voting process (2005, pp. 57-8). In the technocratic model techniques developed by experts “shape the goals” of politicians (Goode, 2005, p. 58). Whereas decisionism acknowledges an element of irrationality in the policymaking process (Habermas, 1971), in the technocratic model “[t]he politician would be at best a stopgap in a still imperfect rationalization of power, in which the initiative has in any case passed to scientific analysis and technical planning” (Habermas, 1971, p. 64). In response Habermas advances a pragmatistic model of interactive expert advice, political consultation and mediation by the public that he believes will be both more rational than decisionism and more democratic than technocracy (1971).

Although, according to Reiner Grundmann, it would not be surprising for the IPCC to put forward a technocratic reading of its function, the results of his comparison of its influence or otherwise on policy-making in Germany and the United States in the years prior to the election of Barack Obama are suggestive of decisionism or interest politics (2007). For its part, the IPCC describes its work as “policy-relevant and yet policy-neutral, never policy-prescriptive” (IPCC, n.d.), an interpretation of the role of science echoed in 2006 by Dr Geoff Garrett, then Chief Executive of one of Australia’s primary employers of climate-change scientists, the CSIRO. Announcing the release of a revision of that organization’s public comment policy, Garrett asked all the organization’s scientists “to avoid making direct comment for or against government or opposition policy” (CSIRO, 2006). Although the press release in which this request appeared encouraged CSIRO scientists to talk openly to the media about their peer-reviewed findings, their Chief Executive went on to say that their job was “to inform policy, not to prescribe it, and to be an authoritative and honest broker, rather than an advocate”. However, when government-funded climate-change scientists publicly advocate specific policy action (see, for example, Wilkinson, 2008), they demonstrate a concern that their scientific evidence is failing to speak for itself. In so doing, they reveal that normative considerations are part of their scientific discourse.

Hence Habermas’s critique of scientism brings to the fore two dangers for climate-change scientists seeking publicity in the mass media: firstly, popular extrapolations of critiques of scientism may lead sectors of the lay public and some journalists to devalue or misunderstand the use of scientific method in climate-change research – a devaluing or misunderstanding that may be taken advantage of by businesses opposed to reductions in greenhouse gas

emissions (for example, the Competitive Enterprises Institute (n.d.), partly funded by Exxon, which has used television advertisements to confuse the public about global warming science); secondly Habermas's procedural rationality has tended to be an uneasy fit for climate-change scientists, sometimes leading to public perceptions of disharmony among individuals who are, in fact, on the same side. In the following section I will discuss some ways in which climate-change scientists have responded.

## **7 Climate-Change Scientists and the Contemporary Public Sphere**

In Section 3 I outlined a number of negative outcomes for climate-change scientists attempting to publicise their work in the mass media. In this section I take up a challenge mounted by Dahlgren to avoid the pessimism of Habermas's view of the degenerative influence of the mass media on the progressive, democratising capacity of the public sphere and consider instead the "evocative power" of the public sphere in the electronic media age for "providing us with concrete visions of the democratic society which are enabling rather than disabling" (Dahlgren, 1991, pp. 8-9).

Globalisation has resulted in a vastly different society from that which existed at the time of the bourgeois public sphere. Not only is trade global, but as we know all too well, pollution has begun to have complex global consequences that consensus climate-change science indicates require a global response. In such circumstances, global communications networks are crucial to the ability of the public to deliberate on their economy, government and environment. Such networks enable participants in the public sphere to engage in what Thompson (1995) describes as mediated interaction (such as email conversations) and mediated quasi-interaction (such as reading online newspapers) about global events so distant or pervasive that face-to-face debate would be spatially impossible and direct democracy practically ineffective.

In these circumstances, a globalised mass media, journalistic mediation of the complex findings of climate-change scientists, and scientists' own use of the Internet, can contribute to rational-critical debate on climate change by the lay public.

In her evaluation of the relationship between scientists and the media, published in 1999, Sharon Dunwoody argued that, after keeping each other at arm's length until very recently, scientists and the media were by then developing a shared culture as a result of "vigorous scientific efforts to understand how journalists work and to participate in the construction of

popular images of science” (p. 75).

It is possible that even before 2007 this increasing media sophistication among climate-change scientists and their greater comfort in working with journalists were resulting in proportionally better journalistic mediation than in earlier years. For example, in his review of *New Yorker* journalist Elizabeth Kolbert’s book *Field Notes from a Catastrophe: Man, Nature and Climate Change*, scientist Gavin Schmidt (2006) commented that he provided information for Kolbert, applauded the fact-checking of the *New Yorker* and praised the book’s success in presenting the work and conclusions of scientists, thus demonstrating his faith in the ability of this journalist to convey scientific information accurately.

Added to their increasing sophistication about journalism and the mass media is climate-change scientists’ contemporary ability to use articles and broadcasts in the mass media as a bridge to mediated interaction with the public via the Internet. By creating their own websites, blogs and Internet forums, 21<sup>st</sup> century climate-change scientists have banded together to provide journalists and interested citizens with the context, clarifications, corrections and elaborations they consider to be missing from media reports and to explain in plain, accessible language, scientific method, peer review, consensus, contrarianism and many other scientific concepts relevant to the debate (see, for example, the websites *RealClimate*, established in 2004 (Schmidt et. al., 2004b), and *What’s Wrong With Still Waiting for Greenhouse* (Hunter, n.d.)).

As public access to the Internet has increased, so has the value of these websites for debate in the public sphere. As noted by Cracknell (1993), scientists are reluctant, on the whole, to engage with politics. This is certainly supported by a statement on *RealClimate* that its scientific contributors will not enter into any discussion of the political or economic implications of their science (Schmidt et al., 2004a) and enforced by codes of practice in Government scientific organisations. Yet the very existence and promotion of *RealClimate* and similar sites prior to 2007 contributed to the ability of the public to deliberate at their leisure on issues of universal importance and, if they so desired, to engage in mediated interaction on the subject with experts through emails, blogs and Internet forums. At last, individual scientists who were not popular science identities were discussing their science with large numbers of widely distributed lay individuals – not face-to-face, admittedly (which Weaver (2007) has found to be more effective), but more directly than through peer-reviewed journals or the mediation of journalists.

The initial stimulus for the transfer to the lay public via the Internet of detailed expert knowledge on consensus climate-change research methods and findings is not only found in journalism. For example, when Margaret Pomeranz, reviewing the documentary *An Inconvenient Truth* (Guggenheim, 2006), made an impassioned plea on the ABC television program *At the Movies* of 6 September 2006 for the setting up of “a body that doesn't have any vested interest in either outcome...that just wants to know the truth and finding out what the truth is” she was emailed by viewers within days informing her of the existence of the IPCC. A link to the IPCC's report was then posted on the website of *At the Movies*. This is an excellent example of what Dahlgren describes as a public sphere today “enmeshed with discourses” from a variety of sources, including entertainment, that contribute to public sense-making rather than detract from it (1991, pp. 16-17). (*At the Movies* and *An Inconvenient Truth* are informative, but I would argue that they are also entertainment.) Such a disintegration of boundaries should not come as a surprise in a contemporary public sphere with its origins in Zaret's multifaceted public sphere.

The ability of journalists to mediate the messages of climate-change scientists more effectively, the intermeshing of discourses in the mass media and the willingness of climate-change scientists to provide additional detail and opportunities for mediated interaction via the Internet lend weight to Thompson's argument that a largely unmediated public sphere is not necessarily the best path to a better form of democratic life, particularly given that face-to-face debates including everyone who might be affected by a global threat are impossible (1995, p. 262). Elaboration by consensus climate-change scientists (and, of course, scientific climate-change sceptics) and the opportunities this provides for public deliberation can help lay the foundations for Thompson's concept of deliberative democracy – “a conception of democracy which treats all individuals as autonomous agents capable of forming reasoned judgements through the assimilation of information and different points of view” (1995, p. 255).

To Thompson's words must be added the qualification that for individuals to avail themselves of the information and criticism provided by climate-change scientists on the Internet, they must make a conscious decision to access the climate-change scientists' websites. As noted above, better journalistic mediation of climate-change science and references to climate-change in mass entertainment and popular science media may encourage more individuals to take that step.

Empirical analysis of the extent to which climate-change scientists are today more willing to accept the overt public expression of political views by their colleagues than they were in

1988 is not the purpose of this paper, but anecdotal evidence suggests that this would be a fertile area for further research. For example, prior to the release of the IPCC's Fourth Assessment Report (2007), RealClimate pointed out inadequacies in environmental scientist Tim Flannery's *The Weather Makers: The History and Future Impact of Climate Change* (2005) in terms reminiscent of the scientific attacks on Hansen in 1988:

Flannery is quite critical of the IPCC process...I think he is fundamentally (sic.) mistaken on this point and his too-frequent absolutist statements based on preliminary science are a classic example of why "consensus" reports are both more careful and more correct than an individual opinion. (Schmidt, 2006b)

However, since the Fourth Assessment Report many climate-change scientists have made public pleas for policy action, or pushed the boundaries of what might pass as a discussion of the scientific implications of their work (see, for example, Arup, 2009; Mares and Sackett, 2009; Smith, 2009; Sydney Morning Herald, 2009; Wilkinson, 2008). In view of this, it may be valuable to try to determine how much, for how long and with what consequences the establishment in 1988 of the IPCC, coinciding as it did with the Hansen events and an increase over two subsequent decades in public access to the Internet, influenced the effectiveness of climate-change scientists in the public sphere on the one hand and, on the other, their ability to dissociate themselves from political considerations by referring journalists and the general public to IPCC knowledge and authority.

My final point is a tentative one and relates to the way in which the Internet may be contributing to a better understanding of scientific method in the general public. Goode has argued that the nature of the Internet may "help to foster a sense of being more at ease with the provisional, partial and decentred nature of our ways of viewing the world" (2005, p. 112):

digital texts such as web sites, blogs, discussion forums and so on, admit of continual reworking and modification in ways that were scarcely imaginable in the analogue era. (Goode, 2005, p.111)

As members of the lay public assimilate what Goode's describes as an "ethic of unfinished" (2005, p. 112) on the Internet in which they witness a continuing revision on websites of opinion in light of new information, might they also find themselves more comfortable with scientific uncertainty and the scientific method – more accepting of, and able to evaluate, the idea of peer review and the qualifications that scientists attach to their messages?

In reflecting on the discussion in this section in the light of the above point and more recent developments, two events come to mind: a declaration calling for swift and decisive action to reduce human-induced climate change, signed by 2,500 scientists meeting in Copenhagen in March this year, and the release of geologist Ian Plimer's book *Heaven + Earth* (2009).

The Copenhagen declaration was hailed in a London *Times* article reprinted in the *Weekend Australian* as a “defining moment in scientists’ relations with political leaders, representing a shift away from their traditional role of merely offering advice to telling politicians to act” (Smith, 2009). In the *Weekend Australian* this article appeared below a large image of Prince Charles grinning at samba dancers in Brazil – an image associated with one of three other stories on climate change appearing on the same page. The titles of the other three articles were “Japanese scientists cool on theories” (Alford, 2009), “Light Latin steps follow hard line on climate change” (Times, 2009) and, positioned as if it were a breakout section of the Copenhagen story, “Global warming doubters multiply in the US” (AFP, 2009). Putting aside for another presentation the implications for climate change communication of the *Australian*'s editorial and layout decisions in this instance, it is worth noting the comments of the Gallup analyst Lydia Saad quoted in the last of these stories:

Americans generally believe global warming is real [but] Americans do not view the issue in the same dire terms as the many prominent leaders advancing global warming as an issue. (Saad, in Smith, 2009)

Implicit in this statement is the suggestion that any recent success in communicating the scientific validity of climate change predictions to the US public might not have been accompanied by a corresponding increase in public acknowledgement of dangerously heightened risk. Is it possible that instead of dismissing findings of climate-change scientists on the basis of uncertainty as it might once have done, a public of “reflexive sceptics” (Goode, 2005, p. 113) increasingly comfortable with “the unfinished nature of mediated discourse” (Goode, 2005, p. 113) might now be extending the benefit of the doubt to scientific climate-change sceptics’ assessment of risk? Such a scenario would pose particular problems for climate-change communicators faced with arguments such as those espoused by Plimer, which essentially turn the precautionary principle on its head by entreating readers to be cautious of calls for remediation, for fear of the potential social and economic consequences of that remediation (2009, pp. 489-493).

## 8 Conclusion

In this paper I have sought to show that although academic media research into the events of 1988 and its aftermath suggested that consensus climate-change scientists then encountered many pitfalls in the mass media, such scientists subsequently became more sophisticated in their communications with journalists and in the 21<sup>st</sup> century have used the Internet to improve their ability to contribute to rational-critical debate and lay-public sense-making. I have also proposed that journalism is not the only media output of relevance to such debate but rather is “embedded in and largely contextualized by the other media output with which it appears” (Dahlgren, 1991, pp. 16-17), such as websites, books, documentaries and even entertainment. Finally, I have flagged the possibility that the emergence of an “ethic of unfinish” on the Internet, as elaborated by Goode, may be contributing to a greater acceptance and understanding among the general public of uncertainty in the natural sciences, with unpredictable implications for the communication of risk.

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